

Atty. Dkt. No. 025098-0701 (Formerly 238/168)
Patent

X_1 , X_2 , X_m , $X_{(m+1)}$, $X_{(2m-1)}$, and X_{2m} are carboxamide residues forming carboxamide binding pairs

X_1/X_{2m} , $X_2/X_{(2m-1)}$, $X_m/X_{(m+1)}$,

γ is γ -aminobutyric acid or 2,4 diaminobutyric acid, and

R_1 is $-\text{NH}(\text{CH}_2)_{0-100}\text{NR}_2\text{R}_3$, $-\text{NH}(\text{CH}_2)_{0-12}\text{CONH}(\text{CH}_2)_{0-100}\text{NR}_2\text{R}_3$, or $-\text{NHR}_2$, where R_2 and R_3 are independently selected from the group consisting of H, Cl, NO, N-acetyl, benzyl, C_{1-100} alkyl, C_{1-100} alkylamine, C_{1-100} alkyldiamine, C_{1-100} alkylcarboxylate, C_{1-100} alkenyl, a C_{1-100} alkynyl, and C_{1-100} alkyl-L, where L is selected from the group consisting of arylboronic acids, biotins, polyhistidines comprised from about 2 to 8 amino acids, haptens, solid phase supports, oligodeoxynucleotides, N-ethylnitrosourea, fluorescein, bromoacetamide, iodoacetamide, DL- α -lipoic acid, acridine, captothesin, pyrene, mitomycin, texas red, anthracene, anthranilic acid, avidin, DAPI, and oligodeoxynucleotide, isosulfan blue, malachite green, psoralen, ethyl red, 4-(psoraen-8-yloxy)-butyrate, taartaric acid, and (+)- α -tocopheral, suitable for use as a DNA-binding ligand that is selective for identified target DNA-sequences $5' \text{--} \text{WN}_1\text{N}_2 \dots \text{N}_m\text{W-}3'$ where m is an integer having a value from 3 to 6, the method comprising:

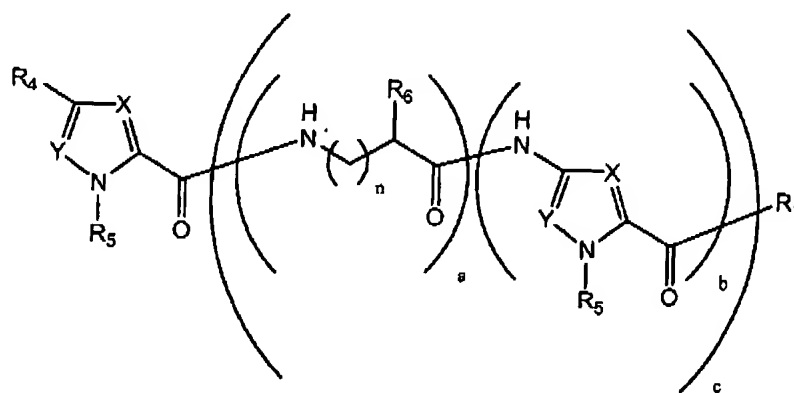
(a) identifying a target sequence of double stranded DNA having the form $5' \text{--} \text{WN}_1\text{N}_2 \dots \text{N}_m\text{W-}3'$, $\text{N}_1\text{N}_2 \dots \text{N}_m$ being the sequence to be bound by carboxamide residues, wherein each N is independently chosen from the group A, G, C, and T, each W is independently chosen from the group A and T, and m is an integer having a value from 3 to 6;

(b) representing the identified sequence as $5' \text{--} \text{Wab} \dots \text{xW-}3'$, wherein a is a first nucleotide to be bound by the X_1 carboxamide residue, b is a second nucleotide to be bound by the X_2 carboxamide residue, and x is the corresponding nucleotide to be bound by the X_m carboxamide residue;

Atty. Dkt. No. 025098-0701 (Formerly 238/168)
Patent

- (c) defining a as A, G, C, or T to correspond to the first nucleotide to be bound by a carboxamide residue in the identified sequence;
- (d) selecting Im as the X_1 carboxamide residue and Py as the X_{2m} carboxamide residue if $a = G$;
- (e) selecting Py as the X_1 carboxamide residue and Im as the X_{2m} carboxamide residue if $a = C$;
- (f) selecting Hp as the X_1 carboxamide residue and Py as the X_{2m} carboxamide residue if $a = T$;
- (g) selecting Py as the X_1 carboxamide residue and Hp as the X_{2m} carboxamide residue if $a = A$; and
- (h) repeating steps c - g for b through x until all carboxamide residues are selected;
- wherein Im is N-methylimidazole, Hp is , Py is N-methylpyrrole, A is adenine, G is guanine, C is cytosine, and T is thymine.

49. (Amended) A polyamide designed by the method of claim 1, having the structure:



Atty. Dkt. No. 025098-0701 (Formerly 238/168)
Patent

wherein

R_4 is selected from the group consisting of H, NH_2 , SH, Cl, Br, F, N-acetyl, and N-formyl;

each R_5 is independently selected from the group consisting of H, $(CH_2)_{0-6}CH_3$, $(CH_2)_{1-6}NH_2$, $(CH_2)_{1-6}SH$, $(CH_2)_{1-6}OH$, $(CH_2)_{1-6}N(R_7)_2$, $(CH_2)_{1-6}OR_7$, and $(CH_2)_{1-6}SR_7$, wherein R_7 is $(CH_2)_{0-6}CH_3$, $(CH_2)_{1-6}NH_2$, $(CH_2)_{1-6}SH$, or $(CH_2)_{1-6}OH$;

each R_6 is independently selected from the group consisting of H, NH_2 , OH, SH, Br, Cl, F, OMe, CH_2OH , CH_2SH , and CH_2NH_2 ;

R_1 is $-NH(CH_2)_{0-100}NR_2R_3$, $-NH(CH_2)_{0-12}CONH(CH_2)_{0-100}NR_2R_3$, or $-NHR_2$, where R_2 and R_3 are independently selected from the group consisting of H, Cl, NO, N-acetyl, benzyl, C_{1-100} alkyl, C_{1-100} alkylamine, C_{1-100} alkyldiamine, C_{1-100} alkylcarboxylate, C_{1-100} alkenyl, a C_{1-100} alkynyl, and C_{1-100} alkyl-L, where L is selected from the group consisting of arylboronic acids, biotins, polyhistidines comprised from about 2 to 8 amino acids, haptens, solid phase supports, oligodeoxynucleotides, N-ethylnitrosourea, fluorescein, bromoacetamide, iodoacetamide, DL- α -lipoic acid, acridine, captothesin, pyrene, mitomycin, texas red, anthracene, anthranilic acid, avidin, DAPI, and oligodeoxynucleotide, isosulfan blue, malachite green, psoralen, ethyl red, 4-(psoraen-8-yloxy)-butyrate, taartaric acid, and (+)- α -tocopheral;

each X and Y are independently selected from the group consisting of N, CH, COH, CCH_3 , CNH_2 , CCl, and CF;

each n is an integer from 1 to 2;

each a is an integer from 0 to 1;